

CLAIMS

WHAT IS CLAIMED IS:

1. A fragmentation-resistant instrument panel for use in a vehicle comprising:
 - (a) an outer layer having an inner surface,
 - (b) a core of expanded plastic of a predetermined shape and having an inner surface, said core secured to said inner surface of said outer layer, and
 - (c) an inner layer having an inner surface fixedly secured to said inner surface of said core to thereby at least partially encapsulate said expanded plastic foam between it and said outer layer,

whereby said instrument panel will be resistant to fragmentation in the event that an impact force is applied to said inner layer.

2. The fragmentation-resistant instrument panel of Claim 1 wherein said expanded plastic foam comprises a plurality of small polypropylene beads that are joined to one another by the application of heat thereto.

3. The fragmentation-resistant instrument panel of Claim 1, wherein said outer layer comprises a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

4. The fragmentation-resistant instrument panel of Claim 2, wherein said outer layer comprises a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

5. The fragmentation-resistant instrument panel of Claim 1, wherein said outer layer comprises a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

6. The fragmentation-resistant instrument panel of Claim 2 wherein said outer layer comprises a laminate having an inner ply comprising a material selected from the group

consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

7. The fragmentation-resistant instrument panel of Claim 3 wherein said outer layer comprises a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

8. The fragmentation-resistant instrument panel of Claim 4 wherein said outer layer comprises a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

9. The fragmentation-resistant instrument panel of Claim 1, wherein the outer layer is a bilaminate.

10. The fragmentation-resistant instrument panel of Claim 1, wherein the outer layer is a trilaminate.

11. The fragmentation-resistant instrument panel of Claim 1, additionally comprising an expandable air bag forming a portion of a supplemental restraint system mounted adjacent said inner layer.

12. The fragmentation-resistant instrument panel of Claim 1, wherein the inner layer is a thermoplastic film material.

13. The fragmentation-resistant instrument panel of Claim 1, wherein the inner layer is reinforced with one or more textiles.

14. A method of manufacturing a fragmentation-resistant instrument panel for use in a vehicle, comprising the steps of:

- (a) providing an outer layer having an inner surface;

- (b) molding a plurality of plastic beads into an expanded plastic foam core of a predetermined shape and having an inner surface;
- (c) securing the core of expanded plastic foam to the inner surface of the outer layer; and
- (d) fixedly securing an inner layer of material onto the inner surface of the core, to thereby at least partially encapsulate the expanded plastic foam between it and the outer layer;

whereby the instrument panel will be resistant to fragmentation in the event that an impact force is applied to the inner layer.

15. The method of Claim 14, wherein the step of molding a plurality of plastic beads into an expanded plastic foam comprises molding a plurality of small polypropylene beads that are joined to one another by the application of heat thereto.

16. The method of Claim 14, wherein the step of molding a plurality of plastic beads into an expanded plastic foam comprises molding a plurality of small polypropylene beads that are joined to one another in a steam chest molding process.

17. The method of Claim 14, wherein the steps of molding a plurality of plastic beads into an expanded plastic foam core, securing the core of expanded plastic foam to the inner surface of the outer layer, and fixedly securing an inner layer of material onto the inner surface of the core, occur in a single step using a steam chest molding process.

18. The method of Claim 14, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

19. The method of Claim 15, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

20. The method of Claim 16, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

21. The method of Claim 17, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

22. The method of Claim 14, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

23. The method of Claim 15, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

24. The method of Claim 16, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

25. The method of Claim 17, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

26. The method of Claim 18, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

27. The method of Claim 19, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

28. The method of Claim 18, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

29. The method of Claim 19, wherein the step of providing the outer layer comprises providing a laminate having an inner ply comprising a material selected from the group consisting of cross-linked polypropylene, cross-linked polyethylene, polyurethane, thermoplastic polyolefin, and polypropylene.

30. The method of Claim 14, further including a step of providing an expandable air bag forming a portion of a supplemental restraint system mounted adjacent the inner layer.

31. The fragmentation-resistant instrument panel of Claim 14, wherein the outer layer is a bilaminate.

32. The fragmentation-resistant instrument panel of Claim 14, wherein the outer layer is a trilaminate.

33. The fragmentation-resistant instrument panel of Claim 14, wherein the inner layer is a thermoplastic film material.

34. The fragmentation-resistant instrument panel of Claim 14, wherein the inner layer is reinforced with one or more textiles.